

Open Research Online

The Open University's repository of research publications and other research outputs

Exploring smart city atmospheres: The case of Milton Keynes

Journal Item

How to cite:

Cook, Matthew and Valdez, Alan-Miguel (2021). Exploring smart city atmospheres: The case of Milton Keynes. *Geoforum*, 127 pp. 180–188.

For guidance on citations see [FAQs](#).

© 2021 The Authors.



<https://creativecommons.org/licenses/by/4.0/>

Version: Version of Record

Link(s) to article on publisher's website:

<http://dx.doi.org/doi:10.1016/j.geoforum.2021.10.015>

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

oro.open.ac.uk



Exploring smart city atmospheres: The case of Milton Keynes

Matthew Cook^{*}, Alan-Miguel Valdez

School of Engineering and Innovation, Faculty of Science, Technology, Engineering and Mathematics, The Open University, Walton Hall, Milton Keynes MK7 6AA, United Kingdom

ARTICLE INFO

Keywords:

Urban atmospheres
Affective atmospheres
Urban storytelling
Smart urban futures

ABSTRACT

Smart cities are rapidly becoming the main form of urban development initiated in response to calls to address certain ills such as unsustainable cities. Often presented as rational responses to such challenges, there are affective dimensions which are political and impact their development in various places. We investigate these affective dimensions by using the concept of atmospheres -collective affects arising from encounters between places, actors, materialities and (hi)stories. Our work builds on the premise that acceptance of smart city initiatives relies on their supporter's ability to disseminate compelling stories about smart urban futures. Atmospheres matter here because the stories that can be credibly told are not arbitrary – to be believed, urban stories must be embedded in and coupled to the materialities and affects of their environment.

The aim of this paper is to investigate the deliberate cultivation of atmospheres by actors with urban remits, revealing how such atmospheres can become impactful mechanisms for selectively rendering cities amenable or refractory to different stories about smart urban futures. An in-depth case study of the English new town of Milton Keynes is presented to illustrate how atmospheres have been cultivated to selectively resist or reinforce the stories through which the smart city agenda is advanced. Narratives about rationality and data-driven efficiency were translated into specific versions of the future. The resulting encounters gave rise to atmospheres of reception, anticipation, innovation and progress through which urban spaces were rendered selectively receptive to specific forms of smart development in pursuit of local, contextually defined goals.

1. Introduction

Current ways of making cities and living in them are acknowledged to be unsustainable, with rapid urban transformation needed to avert environmental catastrophe (Yigitcanlar et al., 2019; Hodson et al., 2017). In response, multiple cities around the world have initiated smart city developments to help meet their sustainability goals. Information and communication technologies including sensor networks, data centres and control rooms have been deployed in various cities to synchronise and integrate urban systems such as transport and energy, lower their ecological footprint and stimulate technological entrepreneurship (Karvonen et al., 2020; Caprotti & Cowley, 2019; Kitchin et al., 2019). As an increasing number of cities become amenable to such data-driven urbanism, the rise of the smart city has catalysed numerous debates around the heightened role of transnational technology firms in urban planning and management and ultimately about who or what controls the smart city (Karvonen et al., 2020). Here, there is growing concern about the increasing power of transnational corporations to

story urban developments through a placeless language of ‘best practices’ and ‘replicable solutions’ which seek to remake cities according to universal ‘smart city in a box’ paradigms (Odendaal, 2021; Joss et al., 2019).

Control over how (smart) urban futures are storied is a matter of concern, as such urban stories are impactful and power laden (Karvonen, 2020; Miller, 2020; Söderström et al., 2014; van Hulst, 2012). Seen this way, the widespread embrace of the smart city and its globalising influences may be partly explained by its supporter's ability to disseminate compelling visions and stories about the future of cities (Söderström et al., 2014; Sadowski & Bendor, 2019). As the interests of global corporations, financiers and real estate developers seem to eclipse those of the residents of smart cities, there is an urgent need for research about how cities may be able to rebel against the smart city agenda or repurpose it to advance locally defined goals (Charnock et al., 2021).

This paper brings an atmospheric approach to bear on this problem. It argues that place-based constellations of materialities, histories, relationships and sensations have been deliberately cultivated by actors

^{*} Corresponding author.

E-mail address: matthew.cook@open.ac.uk (M. Cook).

with urban remits to strategically give rise to affective atmospheres. Through the careful cultivation of specific atmospheres, placeless stories about smart urban futures can be selectively resisted or embraced in pursuit of contextually defined goals. Such atmospheres are impactful because urban storytelling, to be plausible, must be embedded in and tightly coupled to its environment (Engels et al., 2020). Buildings, artefacts, histories, emotions and sensations become key markers and symbols that exert a force on the production of space and become entangled in mechanisms of contestation, resistance and political claims-making (Björkman & Harris, 2018). By paying attention to the relationship between place-based urban atmospheres and placeless smart city projects we can learn more about how (smart) cities mediate between the interests of transnational corporations and those of residents. The aim of this paper is to investigate the deliberate cultivation of atmospheres by actors with urban remits, revealing how such atmospheres can become impactful mechanisms for selectively rendering cities amenable or refractory to different stories about smart urban futures.

The remainder of this paper is structured as follows: In part 2 we introduce the concept of atmospheres - shared affects, feelings and moods that emerge from relationships and encounters (between people, places, history, materialities, sensations and events). Research on atmospheres has grown significantly in recent years in a range of disciplines including urban studies, human geography and sociology, with scholars paying increasing attention to their role in the unfolding of social life as well as to the ethical and political possibilities that might be cultivated or revealed through a focus on atmospheric phenomena (Sumartojo & Pink, 2019). In part 3 we follow the introduction to atmospheres with a description of the methods used for data collection and analysis and we discuss the challenges associated with the research of atmospheres that are emergent, contingent, felt through sensorial and emotional experience and therefore resistant to cognitive interpretation. Data are then presented and atmospheric phenomena in the smart city are described in part 4 through a case study based on Milton Keynes (MK), an English new town and aspiring smart city. The case study presents evidence of strategic cultivation of atmospheres since the foundation of MK in 1967, reveals how such atmospheres rendered the new town amenable to smart city approaches and then shows how actors with urban remits were able to leverage atmospheres to engage in simultaneous complicity with and resistance to smart urban futures. We then present the discussion and conclusions in part 5 and we suggest directions for future research.

2. Taking atmospheres seriously

In everyday speech, the referent for the term atmosphere is multiple, traversing distinctions between people, things and spaces: epochs, societies, streets, rooms, meetings, landscapes and much more are all said to possess atmospheres or be possessed by them (Anderson, 2009; Adey et al., 2013; Rohse et al., 2020). What is common to such apparently dissimilar applications of the concept is that atmospheres are used to denote systems of affective qualities, shared feelings and moods in a particular space or environment (Stewart, 2011; Ash, 2013; Abusaada, 2020). Atmospheres are understood as specific to places and times because the affects, sensations, materialities, emotions and meanings that are enrolled within the force-field of an atmosphere are all the results of cumulative, and therefore historical, interactions between places, materialities, imaginaries and publics (Bille et al., 2015; Edensor & Sumartojo, 2015; Rohse et al., 2020). As entities encounter one another and disclose different qualities these spatial relations appear to change. Consequently, atmospheres do not permeate some form of homogeneous urban space but they take hold over multiple overlapping spaces and times that, while co-present, may never directly encounter or meet one another (Ash, 2013; Anderson & Ash, 2015; Kelly, 2019).

Sumartojo and Pink (2019) propose three distinct but interrelated analytical frames for thinking atmospherically, thus drawing attention

to what can be known by researching in, about and through atmospheres. An orientation towards “knowing in atmospheres” means that researchers must acknowledge that they are immersed in the atmospheres being researched and be explicit about their specific perspective or angle of approach. Researching in atmospheres requires attending to the sensory, material and affective aspects of research itself, with researchers empathically seeking to understand their own experiences of a given atmosphere while reflexively identifying how others may relate to it differently (Sumartojo and Pink, 2019:35). The second orientation, “knowing about atmospheres”, refers to the attempt to understand and describe the configurations and conditions that gave rise to a given atmosphere as well as its effects, the impacts it might have and spaces of possibility created by it (Sumartojo and Pink, 2019:41). Finally, researchers may choose to “know through atmospheres”, using the concept of atmospheres as a route to understanding something else. Atmospheres are thus used to learn something about how things, people and space-times relate to each other and about the power that flows through these relationships (Sumartojo and Pink, 2019:44). While acknowledging that the three analytical orientations are interrelated, complementary and inherently difficult to disentangle, the orientation of this paper is predominantly one of “knowing through atmospheres” with the ultimate aim of investigating how cultivation of atmospheres (deliberate or otherwise) has been applied selectively rendering cities amenable or refractory to different stories about smart urban futures.

Atmospheres are not inert contexts but fields with their own broad tendencies and lines of force (Thrift, 2004; Gandy, 2017). Every affect is experienced both as a particular feeling state and as a distinctive variation in one's willingness or capacity to act in response to that state (Hardt, 2007). To experience place is to be affected by it, becoming entangled to the networks of tactical opportunities and practical resources places invariably present (Duff, 2010, 2017), to the dispositions and agencies potentially enactable in that place as well as the attunements to potential ways of living in or living through things (Stewart, 2011). Atmospheres are not homogeneous and the impacts they have on actor's capacities for action are uneven. As those atmospheres are not inherent to a physical location but rather specific to the interaction of actors and places, the various propensities to act created by them may empower particular actors and coalitions while simultaneously disempowering others in ways that may not be immediately obvious. This paper thus investigates how atmospheres may provide mechanisms to resist smart city narratives to which near-hegemonic power is often attributed, upsetting what would appear to be an uneven negotiation with powerful networks of smart city advocates on one side and actors with urban remits on the other.

It is tempting to assume that smart city narratives promoted by powerful coalitions of actors and mediated through well-established transnational channels would enjoy greater presence than the narrower urban futures storied by local actors. However, the case study presented in the following section suggests that a careful, deliberate cultivation of atmospheres by local actors can provide mechanisms of simultaneous complicity and resistance through which cities are rendered receptive to the resources associated with the smart city narratives and agendas while simultaneously being able to repurpose them to advance their own contextually defined goals. Through the deliberate cultivation of atmospheres, actors with urban remits who sit around the negotiating table opposite of smart city advocates can draw invisible but forceful support from the materialities, histories, relationships and affects that emanate from the cities for which they are responsible. Forceful urban atmospheres can arise spontaneously but they have also been deliberately cultivated for years or even decades to drive policy and development in certain locales (Rose et al., 2016; Blok & Fariás, 2016; Degen & Lewis, 2020). Studies of such strategic cultivation of atmospheres often focus on regeneration projects. For instance, Degen (2008) interrogates atmospheres of regeneration to explore how power relations in public spaces are embedded in, exercised and resisted through the affective geographies of El Raval in Barcelona and

Castlefield in Manchester, arguing that a changing sensuous landscape is crucial in redefining people's social practices, attachments and experiences in places. The “Barcelona model” has become emblematic (Lynch, 2020; Barber & Pareja Eastaway, 2010) becoming a reference point and model for qualitative urban planning (Viderman & Knierbein, 2020; Degen & García, 2012). The attention to symbolic economies and cultivated atmospheres currently associated with urban regeneration projects is likely to be central to smart city projects as well (c.f. Heaphy, 2018).

3. Approach and method

The research investigates the politics of smart city atmospheres through a case study of Milton Keynes (MK), an English new town (and aspiring smart city) founded in 1967. Despite its relatively small population of nearly 300,000, MK has been consistently positioned as a node for policy and sustainability flows and is at the forefront of smart city developments. As a new town whose development has been guided by a carefully laid masterplan, MK provides a case in which the deliberate cultivation of atmospheres by a succession of actors (including planners, architects, policymakers and councillors) is well documented and more readily traceable than what is usual in cities shaped by contingency and organic growth. Interviews provided in-depth first-hand accounts of the making of a smart city, while documentary sources and participant observation provided context and understanding of the historic trajectory of experimental urbanism in MK as well as a sense of how the local atmosphere emerged from MK and shaped it in various ways even before its foundation in 1967.

The case study research was informed by methods for the research of collective affects that form the background of everyday life (Sumartojo & Pink, 2019; Anderson & Ash, 2015; Marotta & Cummings, 2019). Here the paper emphasises three main ways of researching atmospheres: research in, about and through atmospheres, which are set out below. It should be noted that the methodological challenges of learning through atmospheres cannot be readily separated from the practicalities of learning in atmospheres and about them because the relationship between the three ways of approaching atmospheric phenomena is not necessarily linear or sequential. Consequently, the case study will not attempt to neatly categorise atmospheric phenomena but will present a messy and necessarily partial account, reflecting how each of the three complementary atmospheric perspectives exists in dialogue with the others and each has its own methodological challenges.

Research “in atmospheres” requires attention to the environments, encounters and sensations shared by the researcher and by other actors immersed in the same atmospheres. Researchers are therefore advised to cultivate a reflexive autoethnographic disposition, attending to their own role as participants of the changing constellation of elements from which atmospheres emerge. A reflexive approach also requires acknowledgement of the necessarily partial perspective of the researcher, as atmospheres disclose different affects to different actors. Consequently, knowledge apprehended by researchers working “in atmospheres” should not be considered an end in itself but as the basis upon which to empathetically discuss experiences of others sharing the same atmosphere (Sumartojo & Pink, 2019:39). As such, data were collected through participant observation at various policy-oriented events which took place between 2014 and 2020 in which various smart futures for the city were negotiated and translated into plans and policies. Some of the events were related to MK:Smart, a smart city project led by the author's institution; others anticipated the publication of the MK2050 vision for the future of the city (MKF2050, 2016a; MKC, 2020).

Research “about atmospheres” is predominantly achieved by reaching into the past – sometimes remote, sometimes immediate – to try and reach some understanding of what particular configurations felt like and how the effects of those atmospheres may have carried forward. Research about atmospheres generally makes use of descriptive

accounts and archival approaches to identify official efforts to engineer atmospheres (Thrift, 2004; Sumartojo, 2014), contrasting the accounts of official and vernacular sources when possible and always acknowledging the partial perspectives afforded by such accounts. Thus case study data were collected via documentary analysis of materials covering the 1965 – 2020 period. For example, some 60 policy documents produced by various organisation in MK, national and international governmental organisations were analysed.

Crucially, research “through atmospheres” requires critical and political investigation of the encounters and differentials of power that are one of the chief animators of atmospheres. Researchers investigate how atmospheres relate to (urban) futures, attending to the potentials collectively felt and to the new possibilities that were not knowable or possible before orienting towards atmospheres (Sumartojo & Pink, 2019:45). Data about such urban futures were collected by means of interviews conducted between 2016 and 2019 with actors engaged in the smart city debate in MK. 54 interviews were conducted by members of the Smart Cities in the Making research group, with 26 of those directly conducted by the authors as part of their work interrogating smart policy mobilities and governance. Interviewees included elected and appointed government officers from MK and other aspiring smart cities, data scientists, technology developers and consultants, representatives of community and volunteer organisations and representatives of organisations with a national remit such as the Future Cities Catapult.

Through the research the three strands (in atmospheres, about atmospheres, through them) were pursued and weaved into a case study. While the three approaches cannot be readily separated in practice, they are useful for analytical purposes and their iterative application supported the cultivation of an atmospheric sensitivity, which was applied to data collection and analysis (Anderson & Ash, 2015; Duff, 2017; Verlie, 2019). Sumartojo and Pink (2019) advise that research of atmospheric phenomena, which are ephemeral, subjective and continuously beyond definition and grasp, is predominantly pursued through indirect approaches – instead of putting atmospheres themselves in the crosshairs, researchers should work to discover the configurations, labours and contingencies that are needed for atmospheres to be constituted (Pink, 2015). To this end, data were not analysed with the intention of identifying atmospheres directly. Analysis attended to the places, relationships, sensations and emotions present in the data and particularly to any evidence of deliberate efforts to engineer atmospheres and design public spaces or intervene in them with the intention to evoke particular feelings.

Anderson and Ash (2015) also draw attention to the challenge of becoming sensitive to the causal powers of atmospheric phenomena. They acknowledge the problematics that arise from the balancing act required to explicate the background of urban life without reducing it to either an inert context or a mysterious, inaccessible substance outside of all mediation. Owing to the inherent uncertainty of ascribing identities to atmospheres, naming them as part of methodological practice must be acknowledged as a combination of description and speculation. Such commitment to uncertainty also extends to relations of causality. It is not possible to disentangle atmospheric causes and effects or to attribute atmospheric effects to linear sequences of plans and outcomes, as an atmosphere is at once an affect that emanates from a contingent gathering of heterogeneous elements and a cause that may itself have some weight. An atmospheric sensitivity also calls for a methodological approach that traces an atmosphere from a multiplicity of elements, flattening and breaking down of distinctions between actors, narratives, places and materialities to remain open to their potential to weigh upon an atmosphere. Researchers must also account for the possible co-existence of several atmospheres in the same space as the bodies and objects that give rise to them are not equally interactive or accessible to all actors. An atmospheric sensitivity thus calls for an awareness of their selective encounters and engagements. Finally, an atmospheric sensitivity requires attention to transformation. Atmospheric change can be

understood as a matter of affects meeting one another in ways that produce (or fail to produce) new relations. In keeping with the theoretical concerns outlined above, data collection and analysis were sensitive to the affective traces that humans, policies, stories and technologies left in the places where they encountered one another. This involved sustained interest through immersion and direct observation whenever possible as well as careful coding of interviews, field notes and documentary sources.

4. Cultivating smart atmospheres in Milton Keynes

The following section presents the results of the analysis in the form of an in-depth case study. It must be emphasized that the case of Milton Keynes is by no means presented as an example of good practice. Rather the case situates contemporary endeavours in their historical and geographical specificities.

4.1. Early stories and atmospheres in Milton Keynes

The Milton Keynes Development Corporation (MKDC) was established in 1965 to develop a master plan for the new town, drawing ideas from an international network of planners and urban thinkers. In contrast to the drab national agenda pursued through the New Towns Act (building new housing, redistributing London's population and moving the industrial workforce out of urban centres), the Development Corporation pursued its own goals and storied MK as a place for exploring and even reinventing the future urban environment. Even before its foundation the spaces in which the new town was negotiated and planned were immersed in "an atmosphere of energy, excitement and even mission" (Ortolano, 2019:120). The corporation engaged some 254 architects to translate its ideas about urban futures into plans and compelling designs, leading to what Bendixson and Platt (1992:107) described as "a design publicity blitzkrieg that carried the name of Milton Keynes to architects, town planners and landscape architects at the far ends of the earth". The first stage of this was carried through visioning documents, publications in high profile magazines such as the Milton Keynes issue of Architectural Design (AD, 1973) and through the architectural drawings by Helmut Jacoby that still play a prominent role in the mythology and iconography of MK (DiscoveryMK, 2009; CMKTC, 2017; Heathcote, 2019). These images effectively evoked an atmosphere of leisure, prosperity and modernity to mobilise ideas and aspirations for the construction of a new kind of place and urban lifestyle, a practice which (in digital form) has become central to the making of smart cities (Melhuish & Rose, 2014; Degen et al., 2017). This initial image-driven approach was promptly followed by campaigns targeting investors and prospective residents of the new town (Pikó, 2017a). As investors were invited to the developing new town and to the offices of the corporation, furnishings, catering, displays and general housekeeping were carefully staged to create an environment that was "stylish, but not lavish" (MKDC, 1982).

As the city developed and images gave way to realities of concrete and glass, the corporation sought to create places and events where residents and visitors alike could become immersed in the atmospheres of a sustainable future and contribute to their formation, enacting and experiencing the future-oriented urban environments of MK. Initiatives such as the "Homeworld" exhibition in 1981, the MK Energy Park in 1986 and "Energyworld" in 1992 brought together local authorities, researchers from the Energy Consultative Unit, architects and developers, drawing thousands of visitors to MK and leading to press and television coverage of the green housing of the future. Publicity at the time emphasised the sites' ambition as international showpieces and also their quality as experiences - Milton Keynes was storied as a good place to live and learn about urban futures, and as a place that could only be understood through direct presence and immediate experience (Pikó, 2017b:189).

The above initiatives cultivated attractive, prestigious settings with

an atmosphere of innovation and efficiency where energy and information technology companies could demonstrate their products to visitors from the public and industry (Property Management, 1985), including the demonstration of the world's first solar-powered house in 1972 and the UK's first kerbside recycling collection in 1992 (PRP Architects, 2010). While these projects were developed largely independently from each other responding to different agendas and relying on various funding sources, the development corporation storied the urban projects situated in MK into a coherent whole in service of the corporation's goal of positioning MK as a place to explore urban futures. Such positioning was explicitly intended to align local materialities and futures with national ambitions, giving rise to atmospheres driven by the question of "what sort of image can [MK] reasonably project that will fall in line with the current political/economic/social mood?" (MKDC, 1982:2). With this line of inquiry, actors in MK already demonstrated they were willing and able to strategically engage with atmospheres. First, they knew that an alignment of images and moods could be used to mediate the relationship between MK and more powerful actors, which in this case were used to secure resources in times of national budget cuts. Second, they realised that there were limits to the images that specific places could "reasonably project". While they did not frame it in atmospheric terms, further developments covered in this case study indicate that the Corporation's ability to reasonably project images or convincingly sustain narratives depended on constellations of actors, histories, materialities and affects best studied using an atmospheric framework.

4.2. Proto-smart atmospheres in MK

MKDC was intended to be a temporary body and was disbanded in 1992 but it produced a series of guidance documents (MKDC, 1970, 1975a, 1975b, 1983) to provide continuity as its authority was transferred to the Commission for New Towns, to the English Partnerships and later on to MK council. In contrast to the corporation, which had been granted powers that allowed it to govern MK as a sole authority, the new bodies found their powers considerably diminished. National policy during that period was driven by a backlash against the urban governance approaches of the 1960s, which were now perceived to be bureaucratic, maternalistic and even socialist. Consequently, the powers and resources made available to local authorities were constrained and free market solutions to urban problems were encouraged (MKDC, 1982; Ortolano, 2019:258). The development corporation and the bodies that followed negotiated the tension between the national agenda and their own goals: remain in control even as key urban functions were delegated to the free market and continue to provide high quality services despite the backlash against the perceived excesses of the 1960s. To this end, the corporation welcomed free market solutions but encouraged dynamic partnerships where it positioned itself as the only actor with a comprehensive vision of the city (MKDC, 1982). Urban futures in MK, which were at first negotiated between national government and the Development Corporation, gradually became the collective creation of a range of public, private, volunteer and community actors working collaboratively "to create the right atmosphere and environment that will enable all people of Milton Keynes to build the city to which we all aspire" (MKLSP, 2004:11). As a result, a constellation of actors with MK remits updated and gave continuity to the corporations' approach and cultivated mutually reinforcing stories and atmospheres that positioned MK as a place for exploring and reinventing the urban environment. The urban futures thus explored and reinvented already anticipated many of the concerns, aims and strategies that would later characterize smart cities elsewhere. Indeed, a proto-smart MK already anticipated the tensions that would later drive the smart city movement as rapid urban growth encountered the limits of physical infrastructures (particularly transport and energy), financial constraints and environmental concerns.

MK was systematically positioned as a 'test bed' where business and

governmental actors could test new ideas in place, setting standards for future adoption of sustainable urban technologies around the UK (PRP Architects, 2010). Milton Keynes was therefore storied by local government, business and planners as a site where collaborative innovation would become an enabler of sustainable growth (MKLSP, 2004). The collaborative approach, which relied on attracting private funding to address pressing urban problems, was a response to the political atmosphere of the late 1970s (Ortolano, 2019). Given the need to attract investment and generate excitement, the corporation sought to “establish MK as a place where new ideas can take root and flourish” (MKDC, 1982:3). One consequence of this is that urban futures and atmospheres were collectively negotiated by public, private, volunteer and community actors but they could only be implemented and sustained if they could be funded, therefore requiring credible alignments with the agendas of business actors and national government. In effect, implementation of the collectively negotiated urban future required complicity with powerful interests from outside. Atmospheres were thus deliberately cultivated to render Milton Keynes receptive to proto-smart circulations as, starting in the early 1980’s, local authorities anticipated a long-term shift in the economic landscape which would make information technologies prominent and adjusted their narratives and strategies accordingly.

As a result of this strategic shift, local authorities in MK spent the next 30 years deliberately making MK receptive to the needs of technology companies and the desires of knowledge workers. Their strategy was therefore not only about projecting an image but also about cultivating a lived atmosphere, stressing the need to give “much greater thought and emphasis to the psychological qualitative and social aspects of lifestyle as well as the physical and environmental ones” (MKDC, 1983). Local authorities, business leaders and marketers embraced a new marketing approach which can be described as atmospheric on two accounts: First, it took the overall fabric and environment of MK as a framework or “skeleton” to be fleshed out with regard to aspirations, expectations and other psychological or social factors (MKDC, 1983). Second, it emphasised the capacity of MK to elicit “wondrous, uplifting, and desirable bodily sensations” (Pikó, 2017a). Such deliberately cultivated atmospheres render MK a welcoming place for experimental urbanism, with the testbed narrative becoming credible and compelling on account of its resonance with the history, community and environment of the rapidly growing new town (MKLSP, 2004). The narratives and atmospheres thus generated rendered the city amenable to the smart city narratives that would become dominant 30 years later, as the environmental and financial concerns of the late 1970s became relevant again through the 2010s because of climate change and national austerity policies. As significant reductions in council budgets resulted in insufficient funding to address problems falling outside of the statutory duties of local authorities, privately funded technology-driven solutions were sought.

The 2010 Low Carbon Living strategy provides a concrete example of the privately funded technology-driven urban futures that rendered MK amenable to smart city solutions and also exemplifies the cultivation of atmospheres to align contextually defined goals and those of powerful outside interests. Interviews with local authorities reveal that, faced with limited spending power to address challenges outside of their statutory duties, they strategically used their convening power to attract investment, encourage economic development and address emerging urban challenges. They storied the city as an attractive and welcoming place where urban innovations could be demonstrated, refined and profitably exported elsewhere. Data collected from various business-oriented events associated with the Low Carbon Living agenda confirm that there was a future-oriented mood of competitive collaboration-actors from across the UK would meet in MK to learn about how various low-carbon technologies were performing and about how they became part of urban life, with developments in MK generally considered to provide credible and useful predictors of urban futures elsewhere.

The Low Carbon Living strategy therefore attracted investment from national government and corporate actors and brought together various projects such as the deployment of electric vehicle charging points funded by the national Office for Low Emission Vehicles (OLEV); the introduction of a commercially viable electric bus route relying on wireless infrastructure by the global consultancy ARUP and the corporate group Mitsui; and a project for real time capture of energy-related data. Big data technologies and narratives developed for the smart grid project FALCON, led by electricity distribution network operator Western Power Distribution, would later inform the ‘Data Hub’ concept at the core of the smart city programme ‘MK:Smart’ providing a crucial link that rendered MK receptive to the data-driven smart city projects (Valdez et al., 2018). Importantly, many of the artefacts associated with the various projects in the Low Carbon Living programme could be seen every day by the residents, who could see sleek, LED-studded charging points for electric vehicles all around central MK and hear the subtle hum of the electric bus passing by.

During this period there was a sense of constant change and innovation in the lived environment: people would stop and notice the newly installed, LED-studded EV chargers, then after a few months the chargers would be seen as a normal part of the urban landscape but the introduction of an electric bus would sustain the narratives and feelings of urban innovation. Later, the buses were followed by driverless car demonstrators or autonomous robot deliveries so that residents were constantly provided with opportunities to experience a urban future taking shape around them. By having direct experience of the various innovations, residents were able to shape them – for example, with some residents complaining about EV-only parking spaces in the city centre and others requesting the installation of new charging points in residential areas. Other more specialised infrastructures (data centres, recycling plants, energy-efficient buildings) were not as visible but would be visited by national and international delegations. As a result, residents, visitors, laypeople and experts were all able to experience the future-oriented atmospheres that emerged from the encounters of places, technologies, stories and publics. The resulting atmospheres, in turn, increased the credibility of the envisioned urban futures, with one interviewee in local government stating that MK was known as a place with the ability to “punch above its weight” and that his strategy relied on reinforcing and leveraging that reputation. MK was therefore rendered amenable to further urban innovations which ultimately coalesced into a coherent smart city initiative.

4.3. Smart technologies and atmospheres in MK

MK:Smart was a smart city programme that ran from 2014 until 2017. Its main deliverable was the MK Data Hub, a data management platform for the collection, integration and use of large amounts of urban data. The programme was managed by a consortium led by the author’s institution and it continued and updated local actors’ strategy of attracting investment to address urban problems, as it had an overall value of £16.7 million, with an £8M contribution from national government matched by contributions from industry partners. Throughout the duration of the programme many of the projects formerly grouped under the ‘Low Carbon Living’ umbrella were storied as part of the ‘smart’ vision with the expectation that they would become more than the sum of their parts, demonstrating the potential of a joined-up, intelligent and integrated approach. New projects were also easily assimilated because, following the deployment of a data centre early in the life of the project, any project capable of producing urban data suitable for storage in the “Data Hub” could be storied as part of the smart city, attracting resources and generating enthusiasm.

Stories of data-driven futures were used to gather projects ranging from large transport projects led by global consultancies to small citizen-led breastfeeding and community radio applications. Actors ranging from transnational consultancies to small volunteer organisations and community groups felt welcome to approach local authorities and

project leaders to secure resources and, importantly, to gain entrance to the spaces where the smart future of MK was collectively envisioned and negotiated. The variegated projects were thus marshalled into a coherent whole not only by virtue of being storied together but also because they were inflected by the atmospheres permeating the places where the smart city negotiated and governed. Some projects were amplified by such atmospheres in the sense that they felt like a component of a coherent (and exciting) urban future, thus attracting resources and developing supporting coalitions. Other projects failed to resonate and were not further developed. Such spaces (auditoriums, meeting rooms, showfloors) were permeated by atmospheres of excitement reinforced by the prestigious settings, the encounters with authorities, executives and technology developers, and the artefacts in display (e.g., sensor networks, driverless vehicles, urban robots). Such atmospheres were most readily experienced at plenary meetings regularly scheduled at the KMI Podium, an executive suite in the OU. The meetings were generally celebratory, involving reports and presentations by members of each work package (data, transport, water, energy, business, citizen innovation and education). The discussions and the shared visions and the atmospheres that emerged at the plenary meetings were all inflected by visions and atmospheres from other places which were drawn into the smart city project and made part of its circulations. Other spaces where the smart city was negotiated and where smart atmospheres could be experienced included:

- The meeting spaces (such as community halls) of neighbourhood groups that interacted closely and frequently with initiatives deployed within their spaces and affecting their communities. For example, “Future Wolverton” provided a forum for residents, businesses and voluntary and community organisations of Wolverton, a railway town that was within the area designated as part of Milton Keynes. The community established a 20-year vision for the development of their community in which future-oriented atmospheres of anticipation were grounded by an appreciation for the Victorian legacy of the town, with the materialities of Wolverton and the urban innovation agenda of MK giving rise to new and distinct atmospheres. Although such groups had limited resources of their own, they had the power to resist developments that did not fit the urban futures envisioned by them. Other community organisations such as Community Action MK regularly brought similar discussions and atmospheres to the doorsteps of local residents, to the offices of the various volunteer organisations in their network and back to the MK: Smart plenary meetings.
- The meetings in the council chamber where local authorities and the public met to discuss, approve and monitor future visions for MK as well as any smart city projects that required support from local authorities. Council meetings were open to the public but there were various citizens and groups with particular motivations to attend (for example, those with agendas related to environmental issues, economic development, education, or social inclusiveness). The council chamber thus became a space of expectation, negotiation and occasionally confrontation.
- Smart stories and atmospheres also were co-created at public fora open to the public but largely attended by a semi-regular group of elite actors. For example, the events organized by the Fred Roche Foundation (incorporated in 1996 to honour the legacy of key figures in the making of the MK master plan) are attended by local officers, land developers, business leaders, leaders of community organizations, junior and senior academics, and a variety of retired but still well-respected figures from various planning bodies. While the events were not part of the formal governance structures, the arguments taking place in such fora framed the problems and shaped the designs and deployments of smart programmes in MK by developing connections between its past and its potentially smart and sustainable future.
- Task groups such as the MK Futures commission created by MK council explicitly cultivated opportunities for engaging the public in issues relating to innovation. For instance, the MK Futures Community Connectors programme was designed to enable the younger generations to engage more fully in future civic activity, making them feel invested in and proud of the various urban innovations in MK. The programme engaged over 250 students who ‘project managed’ various aspects of the 2050 plan for MK to shape their community.
- Most importantly, the smart stories and atmospheres that emerged in the sites above were only credible because they were reinforced by the atmospheres of MK as a whole. Walking across central MK, visitors and residents alike constantly encountered smart atmospheres in the backdrop of everyday life, from the humming of the wirelessly-charged electric buses (Miles & Potter, 2014) to the sight of robots politely navigating their way along the pavements as they deliver groceries (Hern, 2020). Smart atmospheres in MK emerged from spontaneous encounters of publics and materialities in place but were also deliberately cultivated in place through events such as the Festival of Creative Urban Living which took over the streets around the shopping centre with temporary venues such as the “mobile boulevard broadcast” and “utopia station” (Raumlabor, 2019; AFCUL, 2019) or the “Journey to 2050” event which took place inside the shopping centre included exhibits and presentations such as “Making Milton Keynes a Vibrant, Exciting and Sustainable Place”, “Placemaking Projects around the City”, and “Bringing Robots into Smart Cities” (MKF2050, 2019). Although most the visitors attending those events considered them largely as entertainment and engaged with them with some combination of awe or amusement, others took them as opportunities to critically engage with the future of the city, raising concerns or suggesting future directions to the authorities and planners who organised the events.

The atmospheres thus developed rendered the city amenable to multiple open-ended urban futures, as many different forms of urban innovation could be storied into them. However, even as the local atmospheres welcomed, reinforced and gave credibility to many different urban futures, their welcome was not indiscriminate – Interviews with local authorities reveal that they filtered out proposals which contradicted their vision for the MK or failed to address its most pressing problems. Local actors were constantly thinking about places, relationships and stories when they embraced some projects and not others, they were attuned to places, cared for them, had witnessed the processes of sedimentation through which they had been created. When outside actors sought to introduce new technologies and futures, they had an almost instant, intuitive understanding of how they would fit or not within the futures they were collectively creating. Several interviewees in local government stated that a single phone call or meeting was often enough to know if a proposed innovation would relate well to the existing urban constellation while also generating enough excitement. Although they did not frame their decisions in atmospheric terms, projects were welcomed or resisted using affective and relational criteria which can be rightfully described as atmospheric.

Likewise, participant observation of these events organised by community and volunteer organisations revealed that they welcomed the future-orientation of MK but also had the capacity to resist interventions which did not address the needs of their communities or did not fit the character of the places where they would be deployed. Once again, a relationship between actors, materialities and (hi)stories gave rise to atmospheres which could be experienced by residents and visitors and which welcomed some specific futures while resisting others. This is exemplified by a community group in Wolverton, a Victorian railway town which became part of Milton Keynes as the new town developed around it. Future Wolverton is a community organisation supporting renewable energy and sustainable transport initiatives as well as conservation and heritage work with the explicit objective of celebrating

and enhancing the heritage of its past while developing a sustainable future (Future Wolvert, 2017). The group objected to commercial and residential re-developments with potential to harm designated heritage assets in the area but also embraced smart and sustainable interventions including the construction of 50 ‘smart homes’, the coordination of a community energy microgrid and the deployment of an electric car club intended to ease the parking problems caused by the town’s Victorian street layout.

MK:Smart formally concluded in 2017 but many of the urban technologies developed by it were integrated into the fabric of MK and remain in use or were repurposed, including for example the Data Hub (Connected Places Catapult, 2021; SEMLEP, 2021) and the sensor network originally used by *MotionMap* for detecting pedestrian and vehicular activity (Smart Transport, 2020). As technologies were repurposed, the smart city narrative in MK gradually moved away from data driven urbanism and gave a more prominent role to AI, with self-driving cars and delivery robots transforming the smart city into an autonomous urban creature, as has also been the case for leading smart city developments elsewhere (Cugurullo; 2020). Interviews with local policy actors suggest that the data driven smart city failed to deliver the benefits it had promised (such as increased efficiencies and lowered environmental impacts) but such disappointments were not allowed to dampen the atmosphere. Instead, data-driven smart urbanism was storied as a learning experience which generated excitement, attracted investment and created innovation networks that could be readily repurposed to explore a new brand of AI-driven smart city. The new AI-driven smart future proved to have more power to generate excitement and inspire new forms of living in the city, as driverless cars and delivery robots gave rise to stronger affective responses than the invisible data flows that had defined the previous iteration of smart. The local community readily embraced the little robots, with toddlers attempting to feed them bananas, teenagers interviewed for 2050 visioning events stating that they felt proud of living in the town with the robots, and adults placing over a million deliveries since the launch of the demonstrator in 2018. Owing to the strong affective responses by people who used the robots or who simply lived with them, smart atmospheres were transformed and reinforced and a new urban future was embraced by authorities and technology developers and readily accepted by residents.

In addition to its impact on the socio-technical fabric of MK, MK:Smart helped galvanize an innovation ecosystem and was leveraged to develop an enduring narrative positioning MK as a smart city with national and even global reach (MKF2050, 2016a). Smart city technologies are central to the medium and long-term plans advocated by the MK Futures 2050 Commission (MKF2050, 2016a; MKF2050, 2016b), an independent body launched by local government and advised by planners, academics and consultants to address potential longer-term futures for Milton Keynes. Smart projects supported by the MK2050 vision include: The construction of a smart city university that will learn from the city as a living lab, the development of a smart, shared and sustainable transport system, and the positioning of MK as a hub in the Oxford to Cambridge arc. The latter is significant in that the arc was proposed by the National Infrastructure Commission largely as a transport and housing programme but various actors in MK have consistently storied smart transport as the key for achieving the goals of the Commission. By positioning MK as the fulcrum of a smart transport corridor between Oxford and Cambridge (House of Commons, 2016; MKC, 2020) it was implied that smart technologies would increase the reach and influence of MK within the region, a key component of the MK strategy that had been decades in the making and consistently foregrounded affects, atmospheres and futures as impactful and political:

...to make Milton Keynes a natural location [for technology companies, rather than one among many alternatives], Milton Keynes would need to be seen as a major growth area. [This ambition will require] a City and community dedicated and committed to meeting

the needs and expectations of those companies and creating an overall environment in which they can thrive. Those circumstances would, it is thought, be created by Milton Keynes achieving a status as the focal point of a new technologically-oriented sub-region extending from Oxford in the west to Cambridge in the East... becoming the accepted leader in providing for new technology and other modern industry as well as being the principal business and commercial centre with a diverse range of cultural, entertainment and leisure facilities of both local and sub-regional significance (MKDC, 1983).

The re-framing of a major national project as “smart” can be seen as the culmination of a 35-year strategy to cultivate a narrative and to reinforce it through a deliberate cultivation of atmospheres to render MK attractive to funders and to knowledge workers, demonstrating the profound entanglement of frames, atmospheres and smart ways of thinking. Through the decades, various projects, ideas and initiatives were deployed in different places and with varying degrees of success and staying power and were loosely held together by a narrative and a sense of shared purpose so that the process was one of experimentation, mutation and sedimentation directed not through a process of formal planning but through countless alignments of innovation projects with place-based atmospheres which, in turn, strategically sought to align local agendas with national and even global moods. Some salient aspects of such atmospheric alignments, as well as their implications, will be discussed in the following section.

5. Discussion and conclusions

We now re-engage with the aim of this paper, which is to investigate the cultivation of atmospheres by actors with urban remits to reveal how such atmospheres can become impactful mechanisms for selectively rendering cities amenable or refractory to different stories about smart urban futures. Since to be credible stories must be embedded in and coupled to their environment, the main argument of this research is that urban atmospheres are impactful mechanisms for selectively rendering cities amenable or refractory to different stories about smart urban futures. Urban storytelling is a matter of concern because stories provide planners with an understanding of what the problem they must (re)solve is and who stands to win or lose as a result of the proposed solution (Mäntysalo et al., 2020; van Hulst, 2012; Söderström et al., 2014). Thus, when actors with urban remits and outside interests negotiate stories about the future of urban life their storytelling is profoundly political.

The research presented in this paper, interrogating the globally circulating ideas and local agendas that converged into specific smart city initiatives, captures the importance of constellations and encounters of places, actors, materialities, hi(stories) and sensations which give rise to affective atmospheres that, in turn, give credibility to some envisioned futures and not to others. It investigates instances where atmospheres are cultivated (deliberately or not) by actors with urban remits to investigate the impacts and outcomes of those atmospheric approaches, paying attention to how they selectively rendered cities amenable or refractory to different stories about smart urban futures. To this end, this paper traces the interaction of atmospheres, stories about urban futures, and multiple urban innovation initiatives deployed in Milton Keynes which eventually were storied as components of a smart city initiative. Atmospheric methods provided a framework for investigating an aspiring smart city as a porous meeting place in which stories, materialities and networks sedimented and where specific atmospheres were cultivated. Documentary research “about atmospheres” and the researchers own reflexive participant-observer work “in atmospheres” were ultimately subordinated to the aim of learning “through atmospheres” which became means to interrogate the relationship of mobile capitals, cities, and stories about urban futures (such as those associated with the smart city).

The case study confirmed that place-based constellations of

materialities, histories, relationships and sensations were deliberately cultivated through the story of MK. That is, by actors with urban remits took care to develop and nurture the relationships of places, technologies, sensations, narratives and affects to manage the way in which MK would be experienced and interpreted by constellations of actors including residents as well as investors, technology developers and national authorities. The case study presents evidence of strategic cultivation of atmospheres since the foundation of MK in 1967, reveals how such atmospheres rendered the new town amenable to urban innovation and ultimately to smart city approaches, which were seen as beneficial because they were associated with capital flows which were used to develop MK and address pressing urban problems.

MK could be readily storied as smart because the smart city framework was easily aligned with long-standing atmospheres and stories about an experimental and progressive city. At the same time local actors were able to resist or reframe stories which did not fit their own contextually defined goals. MK resisted the notions of rational data-driven efficiency commonly associated with a corporate smart city (Hollands, 2015) in which data are used to increase efficiencies so that governments and citizens alike can do more with less (Shelton et al., 2015; Sadowski & Bendor, 2019). Atmospheres in MK were cultivated as means to resistant such drab hyper-rationalities in the eighties (MKDC, 1983; Pikó, 2017b; Ortolano, 2019:253–263) and then again in the 2010s. Modernist narratives about rationality and data-driven efficiency reached into MK through national and global agendas attached to funding and resources but local actors resisted them and transformed them. Some smart urban futures did not resonate with the atmospheres of MK, did not generate positive affects and failed to become a credible part of the future, and yet local actors embraced a version of Smart based on technology-driven growth, low-carbon living and the AI-driven automated city.

The case of Milton Keynes is by no means presented as an example of good practice. Rather the case situates contemporary endeavours in their historical and geographical specificities and, importantly, illustrates that the affective aspects of the smart city, here investigated through an atmospheric lens, are meaningful and impactful. The case study also gave rise to new questions and suggest that there is a need for further atmospheric research in MK as well as in other aspiring smart cities. Further research is needed to interrogate how the strong sense of direction that resulted from aligned atmospheres and stories may have closed down space for debate and inclusion. The case of MK suggests that strategically cultivated atmospheres may potentially circumvent democratic processes. The spaces where smart and sustainable innovations in MK are negotiated have been historically open to the general public but such spaces may not always be as democratic as they seem (Karvonen, 2018; Shelton and Lodato, 2019). Local visioning documents such as the Low Carbon Living Strategy (MKC, 2010) or the vision for 2050 (MKF2050, 2019) outlined vague yet compelling stories about technology-driven, privately funded futures. Such stories have been allowed to take hold over places. Little resistance has been observed as compelling stories give rise to atmospheres that in turn facilitate reconfigurations of the urban fabric. Atmospheres were at first be limited in time and space, taking hold of events such as the Homeworld exhibition in 1981 or the Festival of Creative Urban Living in 2019. Over time they took hold of places through short-lived demonstrator programmes such as the charging points for electric vehicles that appeared selected areas of central MK or the delivery robots making their rounds in a specific neighbourhood. Over time those charging points and robots and various other experiments became the new normal, one more encounter within a general atmosphere of expectation and optimism that did not face resistance at any point. The general public was immersed in the atmospheres which took hold of MK through all those stages, contributing to their collective creation without necessarily having the motivation or ability to deliberately shape them in any way.

Even as cultivation of smart atmospheres appears to circumvent some democratic processes by preventing resistance, it also appears to

be ultimately beneficial for locations such as MK which become able to attract the resources associated with smart city agendas without necessarily placing the future of their cities entirely in the hands of outside interests. Thus, the management of urban narratives and atmospheres can have positive outcomes in terms of economic development and in terms of how people live in and feel about cities that become increasingly mediated by technology. The deliberate cultivation of atmospheres in MK, may explain how the city managed to consistently attract the resources it needed to develop and innovate while maintaining a coherent trajectory across decades. Globally circulating stories about smart urban futures found fertile ground in MK as the new town became an amenable and credible accomplice to enact national and global agendas for technology-driven urban innovation. At the same time, MK resisted the smart city in the sense that it was not swept away by grand visions imposed from outside – globally circulating stories about smart urban futures were incorporated into existing constellations and were transformed by the resulting atmospheric entanglements, making it possible for actors with MK-based remits to develop a version of smart that would support their own contextually defined trajectories and agendas.

CRedit authorship contribution statement

Matthew Cook: Conceptualization, Investigation, Supervision.
Alan-Miguel Valdez: Conceptualization, Investigation, Data curation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

This paper results from a research project funded by the Economic and Social Research Council grant reference ES/N014421/1, Smart Cities in the Making: Learning from Milton Keynes. The research team members were Prof Gillian Rose (Principal Investigator), Dr Nick Bingham, Prof Matthew Cook, Prof Parvati Raghuram, Dr Miguel Valdez, Prof Sophie Watson, Dr Edward Wigley and Dr Oliver Zanetti. Data collected in the course of this research are stored and safeguarded by the UK Data Service (ReShare SN 853674).

References

- Abusaada, H., 2020. Strengthening the affectivity of atmospheres in urban environments: the toolkit of multi-sensory experience. *Archnet-IJAR* 14 (3), 379–392.
- AD, 1973. Milton Keynes. Architectural Design (6).
- Adey, Peter, Brayer, Laure, Masson, Damien, Murphy, Patrick, Simpson, Paul, Tixier, Nicolas, 2013. 'Pour votre tranquillité': Ambiance, atmosphere, and surveillance. *Geoforum* 49, 299–309.
- AFUL. (2019). *A Festival of Creative Urban Living*. Retrieved 07 09, 2021, from <https://afculmk.org/>.
- Anderson, Ben, 2009. Affective atmospheres. *Emotion, Space and Society* 2 (2), 77–81.
- Anderson, B., Ash, J., 2015. Atmospheric methods. In: Vannini, P. (Ed.), *Non-representational methodologies: Re-Envisioning Research*. Routledge, New York, pp. 44–61.
- Ash, James, 2013. Rethinking affective atmospheres: Technology, perturbation and space times of the non-human. *Geoforum* 49, 20–28.
- Barber, Austin, Pareja Eastaway, Montserrat, 2010. Leadership challenges in the inner city: Planning for sustainable regeneration in Birmingham and Barcelona. *Policy Studies* 31 (4), 393–411.
- Bendixson, T., Platt, J., 1992. Milton Keynes: Image and Reality. Granta Editions, Cambridge.
- Bille, Mikkel, Bjerregaard, Peter, Sørensen, Tim Flohr, 2015. Staging atmospheres: Materiality, culture, and the texture of the in-between. *Emotion, Space and Society* 15, 31–38.
- Björkman, Lisa, Harris, Andrew, 2018. Engineering cities: Mediating materialities, infrastructural imaginaries and shifting regimes of urban expertise. *Int. J. Urban Reg. Res.* 42 (2), 244–262.
- Blok, A., Farías, I., 2016. *Urban Cosmopolitics: Agencements, Assemblies, Atmospheres*. Routledge, Abingdon.

- Caprotti, Federico, Cowley, Robert, 2019. Varieties of smart urbanism in the UK: Discursive logics, the state and local urban context. *Trans. Inst. Br. Geographers* 44 (3), 587–601.
- Charnock, Greig, March, Hug, Ribera-Fumaz, Ramon, 2021. From smart to rebel city? Worlding, provincialising and the Barcelona Model. *Urban Studies* 58 (3), 581–600.
- CMKTC, 2017. MK in Perspective. (Central Milton Keynes Town Council) Retrieved 07 09, 2021, from <http://cmktowncouncil.gov.uk/cmkt-news/mk-in-perspective/>.
- Connected Places Catapult, 2021. *MK:5G Connecting Communities*. Retrieved 07 09, 2021, from <https://cp.catapult.org.uk/event/mk5g-connecting-communities/>.
- Cugurullo, F., 2020. Urban artificial intelligence: From automation to autonomy in the smart city. *Front. Sustain. Cities* 2 (38).
- Degen, M., 2008. *Sensing Cities: Regenerating Public Life in Barcelona and Manchester*. Routledge, Abingdon.
- Degen, M., García, M., 2012. The transformation of the 'Barcelona model': an analysis of culture, urban regeneration and governance. *Int. J. Urban Reg. Res.* 36 (5), 1022–1038.
- Degen, Monica, Lewis, Camilla, 2020. The changing feel of place: the temporal modalities of atmospheres in Smithfield Market, London. *Cultural Geographies* 27 (4), 509–526.
- Degen, Monica, Melhuish, Clare, Rose, Gillian, 2017. Producing place atmospheres digitally: Architecture, digital visualisation practices and the experience economy. *J. Consumer Culture* 17 (1), 3–24.
- DiscoveryMK, 2009. 30 years of the Centre:MK - What's your story? - Helmut Jacoby. Retrieved 07 09, 2021, from <http://www.discovermiltonkeynes.co.uk/uploads/1/0/3/9/10393340/08l.pdf>.
- Duff, Cameron, 2010. On the role of affect and practice in the production of place. *Environ. Planning D: Soc. Space* 28 (5), 881–895.
- Duff, Cameron, 2017. The affective right to the city. *Trans. Inst. Br. Geographers* 42 (4), 516–529.
- Edensor, Tim, Sumartojo, Shanti, 2015. Designing atmospheres: Introduction to special issue. *Visual Commun.* 14 (3), 251–265.
- Engels, Prof. Dr. Anita, Kunkis, Michael, Alstaedt, Sören, 2020. A new energy world in the making: Imaginary business futures in a dramatically changing world of decarbonized energy production. *Energy Res. Social Sci.* 60, 101321. <https://doi.org/10.1016/j.erss.2019.101321>.
- Future Wolverton, 2017. Future Wolverton Business Plan 2017–2022. Milton Keynes.
- Gandy, M., 2017. Urban atmospheres. *Cultural geographies*, 24(3), 353–374.
- Hardt, M., 2007. Foreword. In P. Clough, & J. Halley, *The Affective Turn: Theorizing the Social* (pp. IX–XIII). Durham NC: Duke University Press.
- Heaphy, L., 2018. Interfaces and divisions in the Dublin Docklands' Smart District'. The Programmable City-Working Paper 37. Maynooth University, Maynooth.
- Heathcote, E., 2019. Milton Keynes: curio from the past or model for the future? *Financial Times* 03 01.
- Hern, A., 2020, 04 14. Robots deliver food in Milton Keynes under coronavirus lockdown. *The Guardian*.
- Hodson, M., Geels, F.W., McMeekin, A., 2017. Reconfiguring urban sustainability transitions, analysing multiplicity. *Sustainability* 9 (2), 299.
- Hollands, Robert G., 2015. Critical interventions into the corporate smart city. *Cambridge J. Regions, Economy Soc.* 8 (1), 61–77.
- House of Commons, 2016. The Oxford-MK-Cambridge Arc, HoC Hansard Vol 613. Retrieved 07 09, 2021, from <https://hansard.parliament.uk/commons/2016-07-12/debates/16071263000002/TheOxford-MK-CambridgeArc>.
- Joss, Simon, Sengers, Frans, Schraven, Daan, Caprotti, Federico, Dayot, Youri, 2019. The smart city as global discourse: Storylines and critical junctures across 27 cities. *J. Urban Technol.* 26 (1), 3–34.
- Karvonen, A., 2018. The City of Permanent Experiments. In: Turnheim, B., Kivimaa, P., Berkhout, F. (Eds.), *Innovating Climate Governance: Moving Beyond Experiments*. Cambridge University Press, Cambridge, pp. 201–215.
- Karvonen, Andrew, 2020. Urban techno-politics: knowing, governing, and imagining the city. *Science as Culture* 29 (3), 417–424.
- Karvonen, A., Cook, M., Haarstad, H., 2020. Urban planning and the smart city: projects, practices and politics. *Urban Planning* 5 (1), 65–68.
- Kelly, David, 2019. Apprehending felt futures in Broome, Australia. *Geoforum* 106, 385–392.
- Kitchin, R., Coletta, C., Evans, L., Heaphy, L., MacDonncha, D., 2019. Smart cities, algorithmic technocracy and new urban technocrats. In: F. R.M. (Ed.), *Planning and Knowledge: How New Forms of Technocracy Are Shaping Contemporary Cities*. Polity Press, Bristol, pp. 199–212.
- Lynch, Casey R., 2020. Contesting digital futures: Urban politics, alternative economies, and the movement for technological sovereignty in Barcelona. *Antipode* 52 (3), 660–680.
- Mäntyselä, Raine, Olesen, Kristian, Granqvist, Kaisa, 2020. 'Artefactual anchoring' of strategic spatial planning as persuasive storytelling. *Planning Theory* 19 (3), 285–305.
- Marotta, Steve, Cummings, Austin, 2019. Planning affectively: Power, affect, and images of the future. *Planning Theory* 18 (2), 191–213.
- Melhuish, M.D., Rose, G., 2014. Architectural atmospheres: affect and agency of mobile digital images in the material transformation of the urban landscape in Doha. *Tasmeem*, 4.
- Miles, John, Potter, Stephen, 2014. Developing a viable electric bus service: The Milton Keynes demonstration project. *Res. Transp. Econ.* 48, 357–363.
- Miller, Thaddeus R., 2020. Imaginaries of sustainability: The techno-politics of smart cities. *Sci. Culture* 29 (3), 365–387.
- MKC, 2010. Milton Keynes Low Carbon Living Strategy and Action Plan, Retrieved 07 09, 2021, from <https://milton-keynes.cmis.uk.com/>.
- MKC, 2020. Milton Keynes Strategy for 2050 Draft for Engagement. Retrieved 07 09, 2021, from <https://www.mkfutures2050.com/>.
- MKDC, 1970. *The Plan for Milton Keynes, Vol 1*. MK Development Corporation, Milton Keynes.
- MKDC, 1975a. *Flexibility 1975 - The Plan for Milton Keynes*. MK Development Corporation, Milton Keynes.
- MKDC, 1975b. *Milton Keynes 2000, a strategic plan for East and West Milton Keynes*. MK Development Corporation, Milton Keynes.
- MKDC, 1982. *City Image: A public Relations Strategy*. MK Development Corporation, Milton Keynes.
- MKDC, 1983. *The future direction of the development and marketing of Milton Keynes*. MK Development Corporation, Milton Keynes.
- MKF2050, 2016a. Milton Keynes: Making a great city greater. Milton Keynes: MK Futures 2050 Commission.
- MKF2050, 2016b. *Transport and Structure of the City*. Milton Keynes: MK Futures 2050 Commission.
- MKF2050, 2019. *Milton Keynes: A journey to 2050*. Milton Keynes: MK Futures 2050 Commission.
- MKLSP, 2004. *Milton Keynes Community Strategy. Our Handbook for change 2004–2034. The City that Thinks Differently Embraces Evolution and Champions Change*. Milton Keynes: MK Local Strategy Partnership.
- Odendaal, Nancy, 2021. Everyday urbanisms and the importance of place: Exploring the elements of the emancipatory smart city. *Urban Studies* 58 (3), 639–654.
- Ortolano, G., 2019. *Thatcher's Progress: From Social Democracy to Market Liberalism through an English New Town*. Cambridge University Press, Cambridge.
- Pikó, Lauren, 2017a. 'You've never seen anything like it': multiplexes, shopping malls and sensory overwhelm in Milton Keynes, 1979–1986. *The Senses and Society* 12 (2), 147–161.
- Pikó, L., 2017b. *Mirroring England? Milton Keynes, decline and the English landscape*. Doctoral thesis. The University of Melbourne, Melbourne.
- Pink, S., 2015. *Doing sensory ethnography*. Sage, Thousand Oaks, CA.
- Property Management, 1985. *Milton Keynes energy park*. Property Manage. 3 (1), 41–45.
- PRP Architects, 2010. *Milton Keynes - a sustainable future: a low carbon prospectus*. MKC, Milton Keynes.
- Raumlabor, 2019. *The Built The Unbuilt The Unbuildable - A festival of Creative Urban Living*. Retrieved 07 09, 2021, from <https://raumlabor.net/the-built-the-unbuilt-the-unbuildable-open-call/>.
- Rohse, Melanie, Day, Rosie, Llewellyn, David, 2020. Towards an emotional energy geography: Attending to emotions and affects in a former coal mining community in South Wales, UK. *Geoforum* 110, 136–146.
- Rose, G., Degen, M., Melhuish, C., 2016. Looking at digital visualizations of urban redevelopment projects: dimming the scintillating glow of unwork. In: Jordan, S., Lindner, C. (Eds.), *Cities Interrupted: Visual Culture and Urban Space*. Bloomsbury, London, pp. 105–120.
- Sadowski, Jathan, Bendor, Roy, 2019. Selling smartness: Corporate narratives and the smart city as a sociotechnical imaginary. *Sci. Technol. Human Values* 44 (3), 540–563.
- SEMLEP, 2021. The UK's first standalone 5G network powers up Milton Keynes. (South East Midlands Local Enterprise Partnership) Retrieved from <https://www.semlep.com/news/2021/the-uk-u2019s-first-standalone-5g-network-powers-up-milton-keynes/>.
- Shelton, Taylor, Lodato, Thomas, 2019. Actually existing smart citizens: Expertise and (non) participation in the making of the smart city. *City* 23 (1), 35–52.
- Shelton, Taylor, Zook, Matthew, Wiig, Alan, 2015. The 'actually existing smart city'. *Cambridge J. Regions, Econ. Soc.* 8 (1), 13–25.
- Smart Transport, 2020, 11 24. Ford's Spin launches £100,000 micromobility UK research. *Smart Transport - Connecting Policy to Solutions*. Retrieved 07 09, 2021, from <https://www.smarttransport.org.uk/news/latest-news/ford-s-spin-launches-100-000-micromobility-uk-research>.
- Söderström, Ola, Paasche, Till, Klausner, Francisco, 2014. Smart cities as corporate storytelling. *City* 18 (3), 307–320.
- Stewart, Kathleen, 2011. Atmospheric attunements. *Environ. Planning D: Soc. Space* 29 (3), 445–453.
- Sumartojo, Shanti, 2014. 'Dazzling relief': floodlighting and national affective atmospheres on VE Day 1945. *J. Historical Geography* 45, 59–69.
- Sumartojo, S., Pink, S., 2019. *Atmospheres and the experiential world: Theory and methods*. Routledge, Oxon.
- Thrift, Nigel, 2004. Intensities of feeling: towards a spatial politics of affect. *Geografiska Annaler: Series B, Human Geography* 86 (1), 57–78.
- van Hulst, Merlijn, 2012. Storytelling, a model of and a model for planning. *Planning Theory* 11 (3), 299–318.
- Verlie, Blanche, 2019. 'Climatic-affective atmospheres': A conceptual tool for affective scholarship in a changing climate. *Emotion, Space Soc.* 33, 100623. <https://doi.org/10.1016/j.emospa.2019.100623>.
- Valdez, M., Cook, M., Potter, S., 2018. Roadmaps to utopia: Tales of the smart city. *Urban Studies* 55 (15), 3385–3403.
- Viderman, Tihomir, Knierbein, Sabine, 2020. Affective urbanism: towards inclusive design praxis. *Urban Design Int.* 25 (1), 53–62.
- Yigitcanlar, Tan, Kamruzzaman, Md., Foth, Marcus, Sabatini-Marques, Jamile, da Costa, Eduardo, Ioppolo, Giuseppe, 2019. Can cities become smart without being sustainable? A systematic review of the literature. *Sustain. Cities Soc.* 45, 348–365.